Lower Duwamish Waterway Remedial Investigation

APPLICATION FOR PERMIT FOR SCIENTIFIC PURPOSES UNDER THE ENDANGERED SPECIES ACT OF 1973

For submittal to:
NMFS

February 5, 2007

Prepared by:

Wind Ward environmental LLC
200 West Mercer Street, Suite 401 • Seattle, Washington • 98119

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A. TITLE

Title: Application for Permit for Scientific Purposes under the Endangered Species Act of 1973. (If the proposal is for field surveys, genetics research, etc.)

Project Name: Lower Duwamish Waterway, WA Superfund Site fish and crab tissue chemical concentrations monitoring program; and East Waterway Operable Unit of the Harbor Island Superfund Site fish and crab tissue chemical concentrations monitoring program.

B. SPECIES SOUGHT TO BE COVERED BY THIS PERMIT

Chinook salmon (*Oncorhynchus tshawytscha*)/ Puget Sound ESU

Steelhead salmon (*Oncorhynchus mykiss*)/ Puget Sound ESU

C. DATE SUBMITTED

February 5, 2007

D. APPLICANT IDENTITY

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E. INFORMATION ON PERSONNEL, COOPERATORS, AND SPONSORS

1. Matt Luxon, Principle Investigator
   Contact information is as listed above

   Thai Do, Field Supervisor
   Windward Environmental LLC
   200 West Mercer St., Suite 401
   Seattle, WA 98119
   Phone: 206.812.5407
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   e-mail: thaid@windwardenv.com

2. To the extent possible, provide a list of field personnel.

Helle Andersen; Jenny Buening; Daniel Diedrich; Thai Do; Emily Duffield; Joanna Florer; Sarah Fowler; Kathleen Hurley; Matt Luxon; Linda Marsh; Fiona McNair; Shannon Pierce; Suzanne Replinger; Angelita Rodriquez; Sara Stillman

3. Provide the name, title, agency, phone number, and any other appropriate contact information for all sponsors, cooperating institutions, etc.
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   PO Box 1209
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4. This project may use contractors such as boat owners/operators or beach seining crews; however, no contractors have been selected at this time. The Principle Investigator or Field Supervisor will be present in the field for all collection activities and will ensure that the selected contractor operates under any and all permit conditions, should a permit be granted.

5. No chinook or steelhead salmon are targeted for collection activities and no tissue samples for these species will be collected. All live chinook or steelhead captured will be returned to the site of capture. If any chinook or steelhead are incidentally killed during fishing operations, the dead specimens will be wrapped in foil and bagged in a zip-loc bag labeled with the time and location where the specimen was obtained and held at -2° C at the Windward Environmental laboratory.

6. Listed species will not be held long term or transported as part of this project.

F. PROJECT DESCRIPTION

1. The purpose of the research is to characterize fish and crab tissue chemical concentrations following remediation of contaminated sediments in the Lower Duwamish Waterway (LDW) and East Waterway Operable Unit (EW) of the Harbor Island Superfund Sites. Juvenile chinook salmon will benefit from this activity directly by minimization of exposure to contaminated sediments. Continued monitoring of fish tissue will verify if cleanup activities are successful in reducing fish tissue chemical contaminant concentrations.

As part of the Superfund process, Windward Environmental LLC (Windward) is conducting a Remedial Investigation (RI) of the LDW and EW. The objective of the RIs is to further characterize the LDW environment and determine risks from contaminated sediments posed to the organisms living in it and to humans using it (recreation activities in or on the river and consumption of organisms from the river). Risk estimates for humans and fish and wildlife have been calculated from chemical concentrations in sediment and in fish and invertebrate tissue (Windward 2006a,

2006b). Cleanup of sediment contamination will occur in the LDW as part of the Superfund process to address risks to human health and ecological receptors. Additional tissue data for fish and crabs is necessary to establish baseline tissue contaminant concentrations prior to cleanup activity and to monitor tissue contaminant concentrations during and following cleanup activity.

2. The Lower Duwamish Waterway Group (LDWG) and the Environmental Protection Agency (EPA) are currently discussing the requirements for collection of additional fish and crab tissue data. Because these data are critical to the assessment of risk to human health and ecological receptors, it is anticipated that EPA will require continued monitoring of fish and crab tissue chemical concentrations.

3. This project is an integral part of the cleanup and ecological restoration of the LDW, the Green River, and the nearshore environment in Puget Sound.

4. This project is not directly related to other ongoing projects. We are willing to cooperate and coordinate activities with other investigations to the extent practicable while collecting data for project specific needs.

5. Listed species are targeted solely for incidental capture, handle, and release in this study. Indirect take will be minimized as discussed under Section K.

G. PROJECT METHODOLOGY

1. Sampling activities will begin at the end of August or beginning of September 2007 and are anticipated to continue into the foreseeable future. Future sampling is necessary to monitor the efficacy of sediment contamination cleanup and determine if sources of chemical contamination have been eliminated.

2. To meet the study objectives listed above, fish and crab will be collected in the summer and or autumn from the LDW using a high-rise otter trawl and shrimp and crab traps concurrently. The numbers and types of samples to be taken are presented in Tables G-1 and G-2. The specific targets species (not listed under the ESA) and numbers retained for chemical analysis may vary from year to year depending on project specific needs. NMFS will be notified of any changes in collection methods or seasons proposed for sampling. US Fish and Wildlife Service (USFWS) and Washington Department of Fish and Wildlife (WDFW) collection permits will be obtained and updated as necessary.

Table G-1.LDW tissue sampling design for fish and crabs

Species	Sample Type	Target Size [a] (cm)	Target Number of Fish or Crab per Composite[b]	Target Number of Fish or Crab per Sampling Area[b]	Total Number of Individuals	Number of Composite Samples, by Area				Notes
						1	2	3	4	
English sole	whole body	≥ 20	5	30	120	6	6	6	6	Starry flounder (>20 cm) will be collected during the sampling events as a potential surrogate to be analyzed for areas where a sufficient number of English sole cannot be caught
	fillet	≥ 20	5	10	40	2	2	2	2	Two composite samples per area for fillets are sufficient to supplement existing data (15 existing skin-off fillet samples; 12 from Area 1 and one each from Areas 2-4) and because fillet data will not be used in the food-web model; all samples to be skin-on fillets
Sculpin	whole body	≥ 12	5	30	120	6	6	6	6	Although sculpin larger than 12 cm are targeted, any sculpin larger than 10 cm collected will be archived.
Shiner surfperch[c]	whole body	≥ 8	5	30	120	6	6	6	6	If a sufficient number of adult striped or pile perch are caught while sampling for other fish species, fillets from these fish will be composited in consultation with EPA and Ecology, and may be chemically analyzed. Perch caught during the sampling event will be archived.
Crab	edible meat	≥ 9	5[c,d]	30	120	6	6	6	6	Crabs may not be abundant in Area 4
	hepato-pancreas	≥ 9	5[c,d]	10	40	2	2	2	2	Two samples per area are sufficient because this sample type plays only a minor role in the risk assessments; crabs may be difficult to collect in Area 4

Area 1 centered at RM 0.6, Area 2 centered at RM 2.0, Area 3 centered at RM 3.3, Area 4 centered at RM 4.6

If caught, adult rockfish may be archived for potential chemical analyses. All target and alternate fish collected will be archived until the composite samples are created in consultation with EPA and Ecology. At that time, any remaining homogenates from individual fish or crabs or from composite tissue samples will be archived; whole fish and crabs not homogenized will be archived for this project only until the data validation is approved by EPA. At that time, whole fish and crabs that had been archived frozen will be discarded. Homogenized fish and crab tissue samples will be archived frozen for one year from collection.

[a] Total length

[b] Actual numbers of fish per composite sample and numbers of fish per sampling area will depend on the number of fish caught

[c] Fillets of shiner surfperch will not be analyzed because fish of this small size are not likely to be filleted prior to human consumption

[d] When possible, the same individuals will be used for edible meat and hepatopancreas samples

[e] Assuming 15 g hepatopancreas tissue and 48 g edible meat per crab

Table G-2. EW tissue sampling design for fish and crabs

Species	Sample Type	Target Size [a] (cm)	Target Number of Fish or Crab per Composite [b]	Target Number of Fish or Crab per Sampling Area [b]	Total Number of Individuals	Number of Composite Samples	Notes
English sole	whole body	≥ 20	5	30	90	18	Starry flounder (>20 cm) will be collected during the sampling event as a potential surrogate to be analyzed for areas where a sufficient number of English sole cannot be caught
	fillet	≥ 20	5	10	20	4	Four composite samples for fillets are sufficient to supplement existing data and because fillet data will not be used in the food-web model; all samples to be skin-on fillets
Sculpin	whole body	≥ 12	5	30	90	18	Although sculpin larger than 12 cm are targeted, any sculpin larger than 10 cm collected will be archived.
Shiner surfperch [c]	whole body	≥ 8	5	30	90	18	If a sufficient number of adult striped or pile perch are caught while sampling for other fish species, fillets from these fish will be composited in consultation with EPA and Ecology, and may be chemically analyzed. Perch caught during the sampling event will be archived.
Crab	edible meat	≥ 9	5 [c,d]	30	90	18	
	hepato-pancreas	≥ 9	5 [c,d]	20	20	4	Four samples area are sufficient because this sample type plays only a minor role in the risk assessments

If caught, adult rockfish may be archived for potential chemical analyses. All target and alternate fish collected will be archived until the composite samples are created in consultation with EPA and Ecology. At that time, any remaining homogenates from individual fish or crabs or from composite tissue samples will be archived; whole fish and crabs not homogenized will be archived for this project only until the data validation is approved by EPA. At that time, whole fish and crabs that had been archived frozen will be discarded. Homogenized fish and crab tissue samples will be archived frozen for one year from collection.

[a] Total length

[b] Actual numbers of fish per composite sample and numbers of fish per sampling area will depend on the number of fish caught

[c] Fillets of shiner surfperch will not be analyzed because fish of this small size are not likely to be filleted prior to human consumption

[d] When possible, the same individuals will be used for edible meat and hepatopancreas samples

[e] Assuming 15 g hepatopancreas tissue and 48 g edible meat per crab

Project Location

Lower Duwamish Waterway (LDW) (Green River Watershed) (Figure 1)

King County

Seattle and Tukwila, WA

Sampling Locations: LDW from the mouth of the East Waterway to RM 6.0.

T 24N R 04E Secs 18, 19, 29, 30, 32, and 33

T 23N R 04E Sec 04

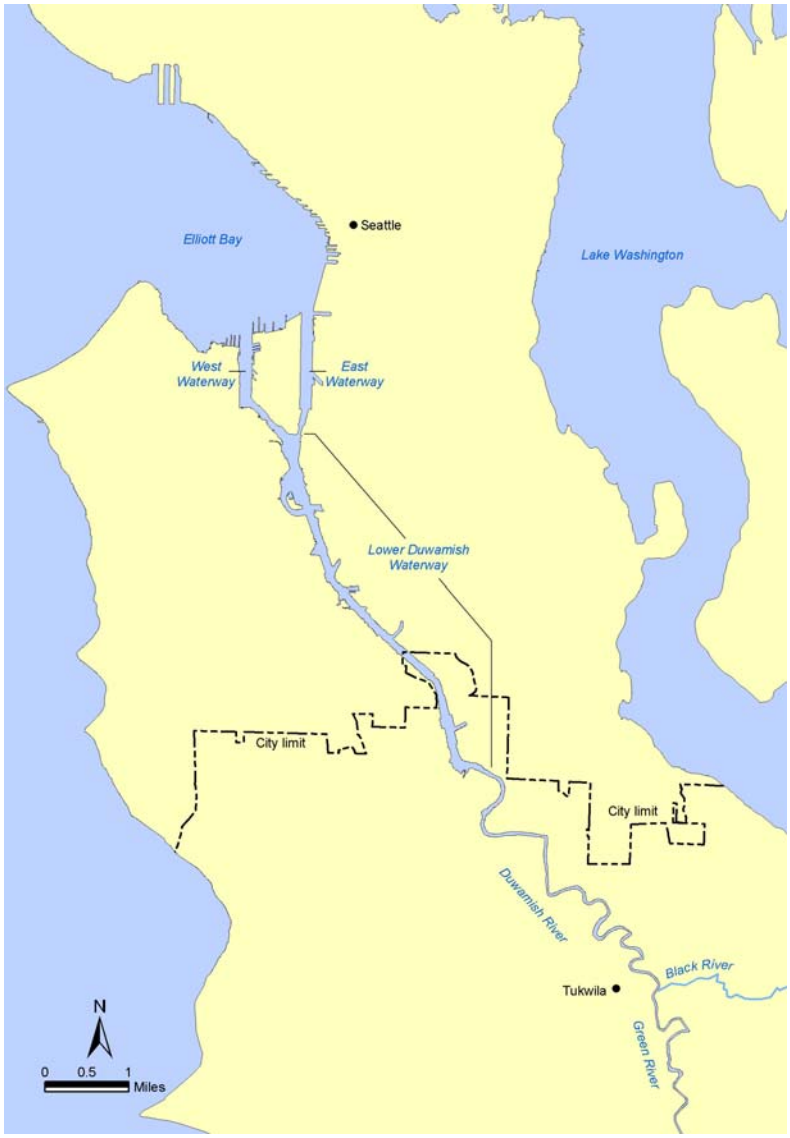

Figure 1. Overview of the LDW region, Seattle, WA

Trawling

The high-rise otter trawl consists of a 25-ft (7.6-m) headrope and 29-ft (8.8-m) footline, side panels with 1.5 in. mesh which open to 5 ft at the wing tips, and 24-in. x 36-in. V-shaped galvanized steel trawl doors. The footline consists of 0.5-in. combination poly/wire with 5.33-oz seine leads interspersed with 2-in. rubber discs, and the headrope has eight 5-in. plastic floats. The 1.25-in. mesh codend also has a knotless nylon corded liner with 0.25-in. mesh.

The trawl will be deployed to the bottom using a winch. When the trawl reaches the bottom, the "dog" of the winch will be set (stopping the release of cable from the winch) and the vessel will begin the trawl. The trawl will progress upstream. The trawl speed will remain constant at 2.5 knots. The spread of the trawl will be approximately 4.7 m, with a rise of approximately 1.5 m. When the vessel reaches the end of each trawl line, the dog of the winch will be released and the trawl will be hauled aboard, allowing the captured species to be processed. The date, time, and location of the trawl will be recorded after each trawl is hauled out of the water.

Trawl start and end points will be recorded using a Trimble NT300D differential global positioning system (DGPS) with 1-2 m accuracy. When the trawl is deployed on the bottom, GPS and clock readings will be taken to mark the starting point of the trawl. Final GPS and clock readings will be made when net retrieval begins.

Traps

Shrimp traps (deployed to catch sculpin), and crab traps (deployed to catch crabs) will be deployed side by side at maximally dispersed locations within a sampling area, two per subarea. Traps will be placed in locations where they will not interfere with vessel navigation and will remain covered by water during the entire time they are in the water.

Traps will be deployed in a different sampling area on each day until target numbers of each target species are obtained or the maximum level of effort for the project is reached. The specific area to be sampled will be based primarily on sampling logistics related to the trawl sampling being conducted simultaneously. If target numbers are met in a given sampling area, sampling will be focused on the remaining areas until targets are met for all areas or the maximum level of effort is met.

Sculpin will be collected using Ladner 30-in. nestable shrimp traps with 0.5-in. mesh. Crabs will be collected using Ladner 30-in. stainless-steel rubber-wrapped crab traps. One trap of each type will be deployed on separate floats at the chosen sampling location (see above). Traps used to capture sculpin will be baited with a mixture of slow- and fast-smolting (dissolving) shrimp pellet bait, or another bait mutually agreed upon by LDWG, EPA, and Ecology. The bait will be placed in 1-quart plastic Scotty brand bait jars with approximately forty 8-mm holes, thus allowing the scent of the bait to spread without allowing access to the bait itself. Crab traps will be

baited with a mixture of fish scraps and squid. Crab bait will be placed in mesh bait bags and tied to the inside of the trap so the bag cannot be opened and its contents consumed. All traps will soak for approximately two hours before retrieval. Traps for sculpin will be hauled in first and at a constant rate to prevent the possible escape of any captured fish. All traps will be retrieved in the same order as they were deployed. The field crew will monitor the traps, to the extent possible, when fishing in areas of high vessel traffic. Any trap(s) determined by the FC to be a hazard to navigation will be moved to a new location within the same sampling subarea away from impending vessel traffic. Any traps lost during sampling will be replaced, and all traps will be outfitted with a degradable latch to ensure that escape holes will open if the trap is lost. The degradable latch will ensure that lost traps will not continue to fish indefinitely, thereby harming local crab, shrimp, or fish. The date, time, and location of the trap will be recorded during both trap deployment and retrieval.

Field sample processing

Fish will be processed using a live sampling technique to minimized the number of non-target species mortalities through species sorting and processing prioritization. Upon completion of an individual effort, the catch will be immediately emptied into a large plastic tub. Tubs will be filled with running seawater on the trawling boat, or frequently renewed static water during seining. Field technicians will sort the catch by species and size into numerous smaller tubs. Target species will be separated from non-target species and processed. Non-target species will be identified to the lowest practical taxon, their numbers estimated and returned immediately to the location of capture. Salmon and other sensitive species will be processed prior to heartier species. Fish unconscious or upside down were held in gently running water until activity became normal prior to release.

3. Alternative sampling techniques are not likely to be necessary because prior use of the techniques described have been successful in this location.

4. It is unlikely that chinook salmon or steelhead will be encountered in traps or trawls. No chinook were encountered during sampling in 2004 or 2005 using these methods. One adult steelhead was captured in the trawl in 2004 and released unharmed. In the boat captain's 20 years of experience, this was the only adult salmon captured in an otter trawl. If chinook or steelhead are encountered it is possible that they would be injured by abrasion from the net or predation may occur within traps. By using the live sampling technique described above, the possibility of lethal take will be minimized.

H. DESCRIPTION AND ESTIMATES OF TAKE

1. WDFW describe the status of Green River (Duwamish) chinook and winter steelhead as "healthy" and Green River (Duwamish) summer steelhead as depressed

(http://wdfw.wa.gov/fish/sasi/). Outmigrant juvenile steelhead are not generally present in the LDW after July (Ruggerone et al. 2006).

Take estimates are presented in Table H.1.

Table H.1 Estimates of annual take for Puget Sound ESU chinook salmon

ESU	LIFE STAGE	ORIGIN	TAKE ACTIVITY	NUMBER OF FISH REQUESTED	REQUESTED UNINTENTIONAL MORTALITY	LOCATION	PERIOD
PS chinook salmon	juvenile	natural or hatchery	capture, handle, release	100	5	LDW	July - October
PS chinook salmon	adult	natural or hatchery	capture, handle, release	2	0	LDW	July - October
PS steelhead	juvenile	natural or hatchery	capture, handle, release	100	5	LDW	July - October
PS steelhead	adult	natural or hatchery	capture, handle, release	2	0	LDW	July - October

2. See 3 below

3. Based on data from 2004 and 2005 trapping and trawling efforts in the LDW, few if any chinook or steelhead salmon are likely to be encountered using these methods (Windward 2005, 2006c). However, large numbers of chinook have been encountered in the LDW using beach seining (Shannon 2006) and it is possible that if juvenile chinook are encountered using the trawl, they may be numerous. Steelhead are much less common but may also be encountered in large numbers.

4. Matthew Luxon is permitted to catch, handle, and release bull trout under USFWS permit TE088853-0. This permit expires in 2007 and extension of this permit is being requested.

I. TRANSPORTATION AND HOLDING

No chinook or steelhead salmon are targeted for collection activities and no tissue samples for this species will be collected.

J. COOPERATIVE BREEDING PROGRAM

If requested by NMFS, we agree to participate in a cooperative breeding program and to maintain or contribute data to a breeding program.

K. PREVIOUS CONCURRENT ACTIVITIES

1. Windward Environmental was listed as a sub-permittee on NMFS Scientific Research Permit #1314.

2. Under permit 1314, Juvenile chinook salmon were targeted for tissue collection. 190 juvenile Puget Sound ESU chinook salmon were authorized for lethal take annually. An additional 12 adult and 776 juvenile Puget Sound ESU chinook salmon were permitted for capture, handle and release, and 16 juvenile Puget Sound ESU chinook salmon were permitted for indirect mortality.

Incidental mortalities were minimized as follows. Fish were processed using a live sampling technique which minimized the number of non-target species mortalities through species sorting and processing prioritization. Upon completion of an individual effort, the catch was immediately emptied into a large plastic tub. Tubs were filled with running seawater on the trawling boat, or frequently renewed static water during seining. Field technicians sorted the catch by species and size into numerous smaller tubs. Target species were separated from non-target species and processed. Non-target species were identified to the lowest practical taxon, their numbers estimated and were returned immediately to the location of capture. Salmon and other sensitive species were processed prior to heartier species. Fish unconscious or upside down were held in gently running water until activity became normal then were released.

L. CERTIFICATION

I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand this information is submitted for the purpose of obtaining a permit under the Endangered Species Act of 1973 (ESA) and regulations promulgated thereunder, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or to penalties under the ESA.

_____ _____

Signature Date

_____

Name and Position Title (print)

Résumés

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Mr. Luxon is a terrestrial and aquatic risk assessment specialist and a wildlife toxicologist with more than fourteen years of experience working on environmental projects at all levels. His project experience has included work on ecological risk assessment, natural resources damage assessment (NRDA), whole-effluent toxicity testing, sediment and water quality assessment, and aquatic, terrestrial and avian ecology. Particular areas of interest include ecological risk assessment, fish ecology, ecological restoration, and toxicological effects on population and community ecology.

Field Sampling and Survey Experience

- Summer 2004 and 2005: Fish tissue collection in the Lower Duwamish Waterway using high rise otter trawl, beach seine, crab traps and shrimp traps. Target species were Dungeness crab, slender crab, English sole, Pacific staghorn sculpin, shiner surfperch, pile perch, striped perch, starry flounder, and rockfish species.
- Summer 2003: Fish tissue collection for the Portland Harbor Remedial Investigation using boat electrofishing, backpack electrofishing & trot line. Target species included sculpin and lamprey ammocoetes.
- Summer 2001: Fish tissue collection for the Lower Duwamish Waterway Remedial Investigation using beach seine. Target species was juvenile chinook salmon.
- 1998 and 1999: Seasonal fish community characterization of the Willamette River and McKenzie River in Oregon and Codorus Creek in Pennsylvania using beach seine, boat electrofishing, backpack electrofishing, & gillnets.
- 1991 to 1997 conducted wildlife surveys for a variety of species including song birds, spotted owl, marbled murrelet, Townsend's big eared bat, sea otter, & bald eagle.

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Mr. Do is an environmental scientist with project experience in fisheries biology, sediment and water quality studies, biological and environmental assessments, and biological and chemical data analyses. His project experience includes work in marine fisheries, sediment and water quality assessments, ecological data analyses and field sampling in terrestrial and aquatic systems. He has experience sampling under Puget Sound Dredge Disposal Analysis (PSDDA) protocols. Mr. Do has expertise in the design and implementation of field studies and techniques for collecting sediment, water, and biological samples. He also has experience in sediment quality studies applying various environmental assessment approaches.

Field Sampling and Survey Experience

- Summer 2004 and 2005: Fish tissue collection in the Lower Duwamish Waterway using high rise otter trawl, beach seine, crab traps and shrimp traps. Target species were Dungeness crab, slender crab, English sole, Pacific staghorn sculpin, shiner surfperch, pile perch, striped perch, starry flounder, and rockfish species.
- Crab and shrimp sampling to ultimately determine site-specific crab consumption rates as part of a HHRA for the Lower Duwamish Waterway.
- Collected benthos, sediment, and water samples for the Lower Duwamish Waterway Remedial Investigation.
- Surface sediment, surface water and fish tissue sampling in the East Waterway of the Lower Duwamish Waterway to characterize the extent of post-dredge contamination.
- Collected benthos, sediment, and water samples as part of an ERA in Portland Harbor, OR.
- Beach seined for juvenile chinook for gut content analysis as part of an ERA in Portland Harbor, OR.
- Conducted surveys in the Lower Willamette River for ecological and human health risk assessments.
- Deepwater electroshocking for lamprey ammocoetes in the Lower Willamette River for tissue residue analysis

- Backpack electroshocking for lamprey ammocoetes in the Siletz River, OR for toxicity reference studies
- Experience in marine and freshwater taxonomy.
- Habitat survey and plant and small mammal tissue collection for a site characterization in St. Helens, OR.
- Performed a wetland monitoring program in Tillamook, OR to assess effects of effluent from a creamery.

REFERENCES CITED:

Ruggerone GT, Nelson TS, Hall J, Jeanes E. 2006. Habitat utilization, migration timing, growth, and diet of juvenile chinook salmon in the Duwamish River and Estuary. King Conservation District and Salmon Recovery Funding Board, Seattle, WA.

Shannon J. 2006. Personal communication (e-mails to Matt Luxon, Windward Environmental, regarding Duwamish-Elliot beach seine data collected by Taylor Associates in 1998, 2000, and 2002-2003. Biologist, Taylor Associates, Seattle, WA. March 30, 2006.

Windward. 2005. Lower Duwamish Waterway remedial investigation. Data report: Fish and crab tissue collection and chemical analyses. Prepared for Lower Duwamish Waterway Group. Windward Environmental LLC, Seattle, WA.

Windward. 2006a. Lower Duwamish Waterway remedial investigation. Baseline ecological health risk assessment. Draft. Prepared for Lower Duwamish Waterway Group. Windward Environmental LLC, Seattle, WA.

Windward. 2006b. Lower Duwamish Waterway remedial investigation. Baseline human health risk assessment. Draft. Prepared for Lower Duwamish Waterway Group. Windward Environmental LLC, Seattle, WA.

Windward. 2006c. Lower Duwamish Waterway remedial investigation. Data report: chemical analyses of fish and crab tissue samples collected in 2005. Prepared for Lower Duwamish Waterway Group. Windward Environmental LLC, Seattle, WA.